



DYNOWARE EX+ UPGRADE INSTALLATION GUIDE

FOR THE MODEL 248
AUTOMOTIVE DYNAMOMETER

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DYNOWARE EX+ UPGRADE

This document provides instructions for installing the DynoWare EX+ components on the model 248 automotive dynamometer (dyno). To ensure safety and accuracy in the procedures, perform the procedures as they are described.

This manual will walk you through removing the original hardware and installing the DynoWare EX+ components. This manual also contains instructions for removing the standard air brake system and installing the optional proportional air brake system.



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CONVENTIONS USED IN THIS MANUAL

The conventions used in this manual are designed to protect both the user and the equipment.

example of convention	description
 CAUTION	The Caution icon indicates a potential hazard to the dynamometer equipment. Follow all procedures exactly as they are described and use care when performing all procedures.
 WARNING	The Warning icon indicates potential harm to the person performing a procedure and/or the dynamometer equipment.

TECHNICAL SUPPORT

For assistance, please contact Dynojet Technical Support at 1-800-992-3525, or write to Dynojet at 2191 Mendenhall Drive, North Las Vegas, NV 89031.

Visit us on the World Wide Web at www.dynojet.com where Dynojet provides state of the art technical support, on-line shopping, 3D visualizations, and press releases about our latest product line.





PARTS LIST

The following table lists all of the parts included in the DynoWare EX+ Upgrade Installation kit. Check your kit against the parts listed to make sure you have received all of the parts. If any part is missing, contact Dynojet Technical Support.

part number	description	quantity
DynoWare EX+ Upgrade (98198106)		
134490301	Nut, #8-32	4
145300001	Air Pressure Regulator	1
145800001	Air Pressure Gauge	1
21646100	DynoWare EX+ Mounting Base	1
21696200	(1) Breakout Board Mounting Bracket and (1) DynoWare EX+ Module Wall Mounting Bracket	2
31616200	Air Pressure Regulator Mounting Bracket	1
318110301	Power Cord, 125V, 10A, 7 1/2 Ft.	1
36540643	Screw, #8-32 x 3/8", Ph-Phil	4
42924090	Breakout Board to DynoWare Cable	1
42924250	DynoWare to Computer Serial Port Cable, 12 Ft.	1
64111003	Brake Solenoid Sub Assembly (Air Brake Control Switch Assembly)	1
65291001	Breakout Board	1
66191001	CPU Module Sub Assembly	1
66192001	RPM Module Sub Assembly	1
66193001	Input/Output Module Sub Assembly	1
66493001	Atmospheric Sensing Module Sub Assembly	1
66954001	Data Acquisition Cable, 20 Ft.	1
761900001	Power Supply	1
91114A009	Washer, #8, Lock	4
A10Z2-304A	Rubber Vibration Dampener Mounts	4
DE100-109S	Secondary Inductive Pickup Cable, 20 Ft.	2
DE100-110L	Primary Inductive Pickup Clip, 20 Ft.	1
The following parts are included in the Proportional Air Brake Installation:		
21619200	Temperature Sensor Bracket	1
31614100	DIN Rail	1
36560834	Screw, 1/4"-20 x 1/2", Button-head	4
44997101	Temperature Sensor	1
64111001	Prop Air Regulator Sub Assembly	1
64111002	Control Valve Sub Assembly (electronic pressure regulator, EPR)	1





REMOVE THE ORIGINAL HARDWARE

This section describes the procedures to remove the PC card from the computer, disconnect and remove the control box, disconnect the air to the dyno brake canisters, and replace the air hose fitting in the top of the right air canister.

If you are only upgrading to the proportional air brake system, skip to the instructions in Appendix A.

REMOVING THE PC CARD

- 1 Shut down the computer.
- 2 Unplug the power cord to both the computer and the control box.
- 3 Remove the computer cover.



WARNING

Electrostatic Discharge (ESD), or static shock, can damage electronic components. To avoid ESD damage, always practice good ESD control precautions. Touch the case of the computer before touching any of the electronics. By touching the case, you discharge any static shocks to the case instead of the to the electronics.

- 4 Locate the PC card cable that comes from the control box and plugs into the PC card in the computer. Unplug it from both the control box and the computer.
- 5 Remove the screw(s) securing the PC card and remove the card from the computer.
- 6 Replace the dust cover to cover up the hole in the back of the computer.
Note: If you no longer have this dust cover, one may be easily obtained from your local computer dealer.
- 7 Replace the computer cover.

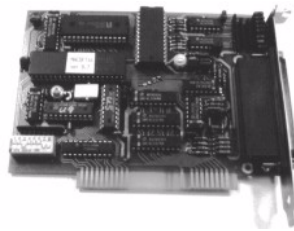


Figure 1: PC Card



REMOVING THE CONTROL BOX

- 1 Shut off and release the air pressure to the control box.
- 2 Disconnect all cables and air hoses from the control box.
- 3 Remove the control box from the wall.

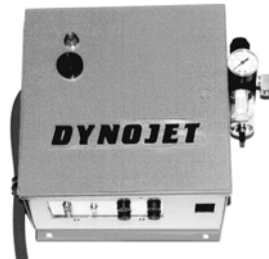


Figure 2: Control Box

- 4 Disconnect the data acquisition cable from the dyno and remove the cable.
- 5 Disconnect the air hose and remove the fitting from the top of the air canister on the right hand side of the dyno.

Note: Leave the air hose with the dyno as it will be used later.

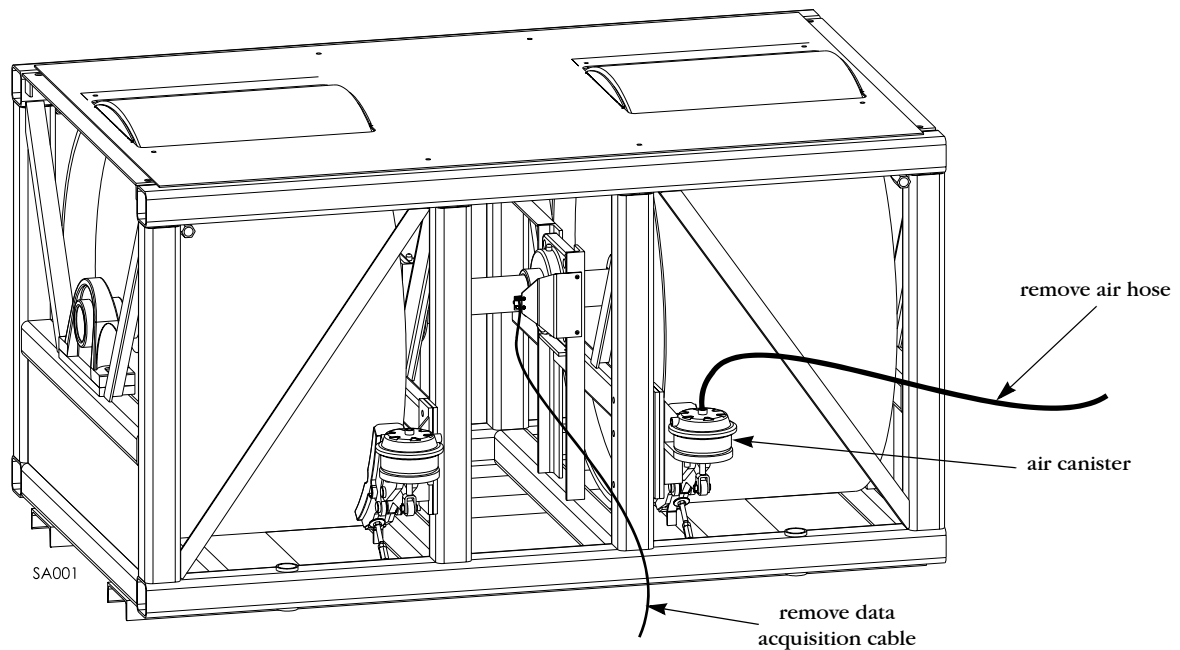


Figure 3: Disconnect Cable and Air Hose



THE DYNOWARE EX+ SYSTEM

The DynoWare EX+ system is comprised of four modules: the CPU Module, the Dynamometer Input/Output Module, the RPM Module and the Atmospheric Sensing Module. The upgrade requires a new Breakout board (the interface between the dyno and the new DynoWare EX+ hardware). These modules need to be located where they will be visible during a dyno run. It is recommended that they be mounted on a shelf on the wall or on a cart along side the personal computer. This section will provide you with the information necessary to install and connect the new components.

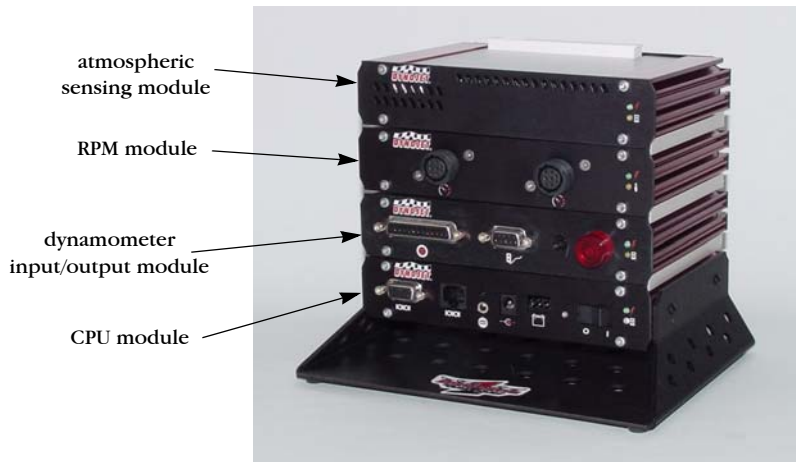


Figure 4: DynoWare EX+ Modules



Figure 5: DynoWare EX+ Components



INSTALLING THE NEW DYNO HARDWARE

- 1 Mark the mounting holes for the Breakout board mounting bracket.
 - 1a Using the mounting bracket as a template, place the bracket so the holes are centered on the cross brace and 2.25-inches in from the post.
 - 1b Using a center punch, mark two mounting holes in the dyno frame.
 - 1c Drill and tap the mounting holes for 1/4-inch UNC bolts.
- 2 Secure the Breakout board to the mounting bracket using four #8 screws.
- 3 Install the mounting bracket to the dyno frame using two 1/4-inch allen head bolts.

Note: If you are installing a proportional air brake system, skip the following instructions and continue with “Installing the Proportional Air Brake System” on page A-3.

- 4 Screw the air brake control switch into the top of the air canister on the right hand side of the dyno.

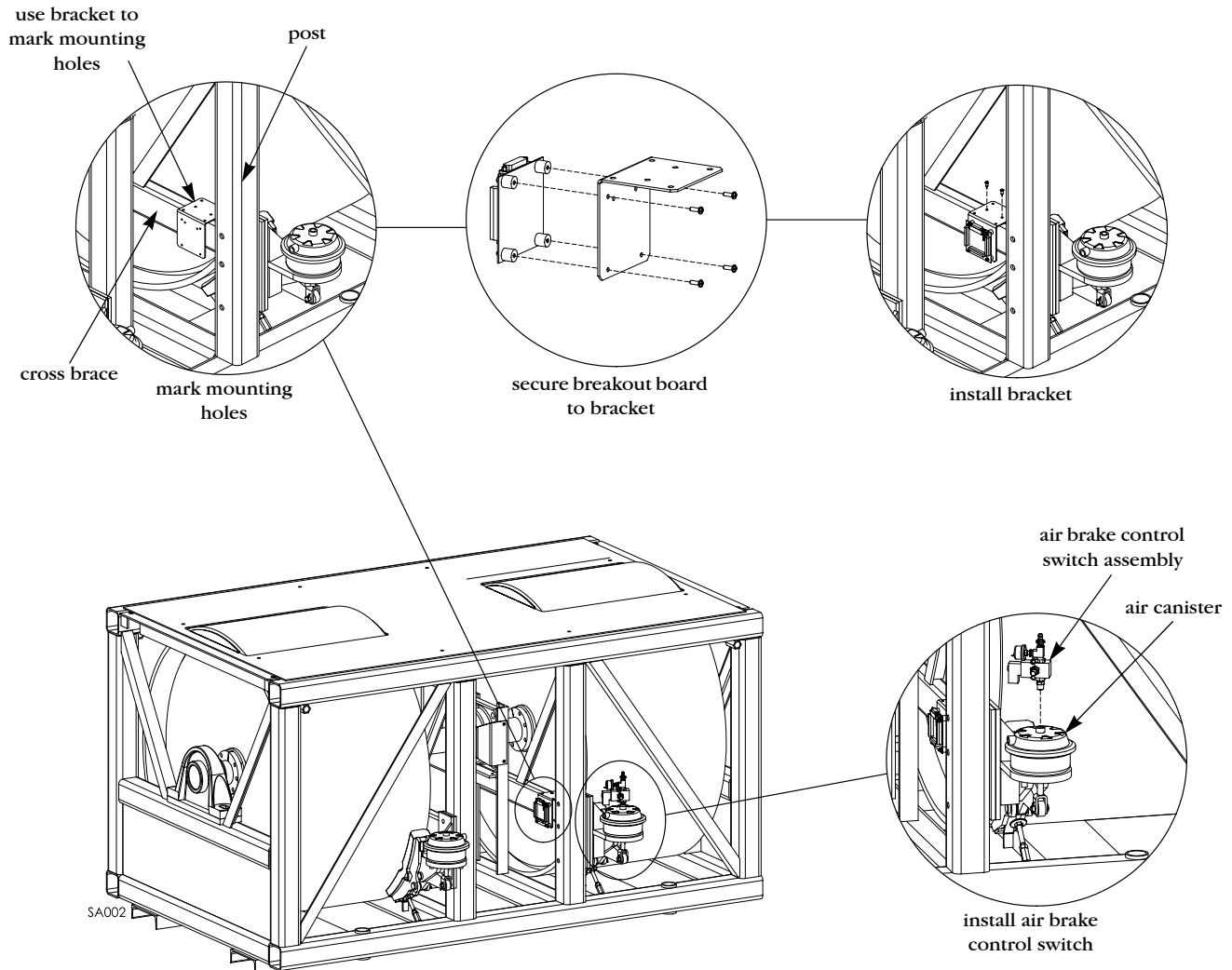


Figure 6: Install the New Dyno Hardware



- 5 Plug the data acquisition cable into the optical pickup card on the dyno.
 - 6 Attach the data acquisition cable coming from the optical pickup card on the dyno to the Breakout board. The data acquisition cable has four wires which connect to the wiring block labeled DRUM 1.
 - Red wire connects to R1
 - White wire connects to W1
 - Black wire connects to B1
 - Silver wire connects to S1
 - 7 Attach the two black wires from the air brake control switch to the wiring block labeled BRAKE on the Breakout board. Each wire may attach in either position.
 - 8 Attach the yellow and black wires from the brake control to the wiring block labeled PRESS on the Breakout board. Each wire may attach in either position.
 - 9 The Breakout board jumper settings are preset, however, verify jumpers J1 and J2 are set for the standard air brake as shown in Figure 7.
- Note:** Make sure that the cables are clear from all moving parts.
- 10 Plug the 25-pin DynoWare Cable into the bottom of the Breakout board and tighten the thumb screws.

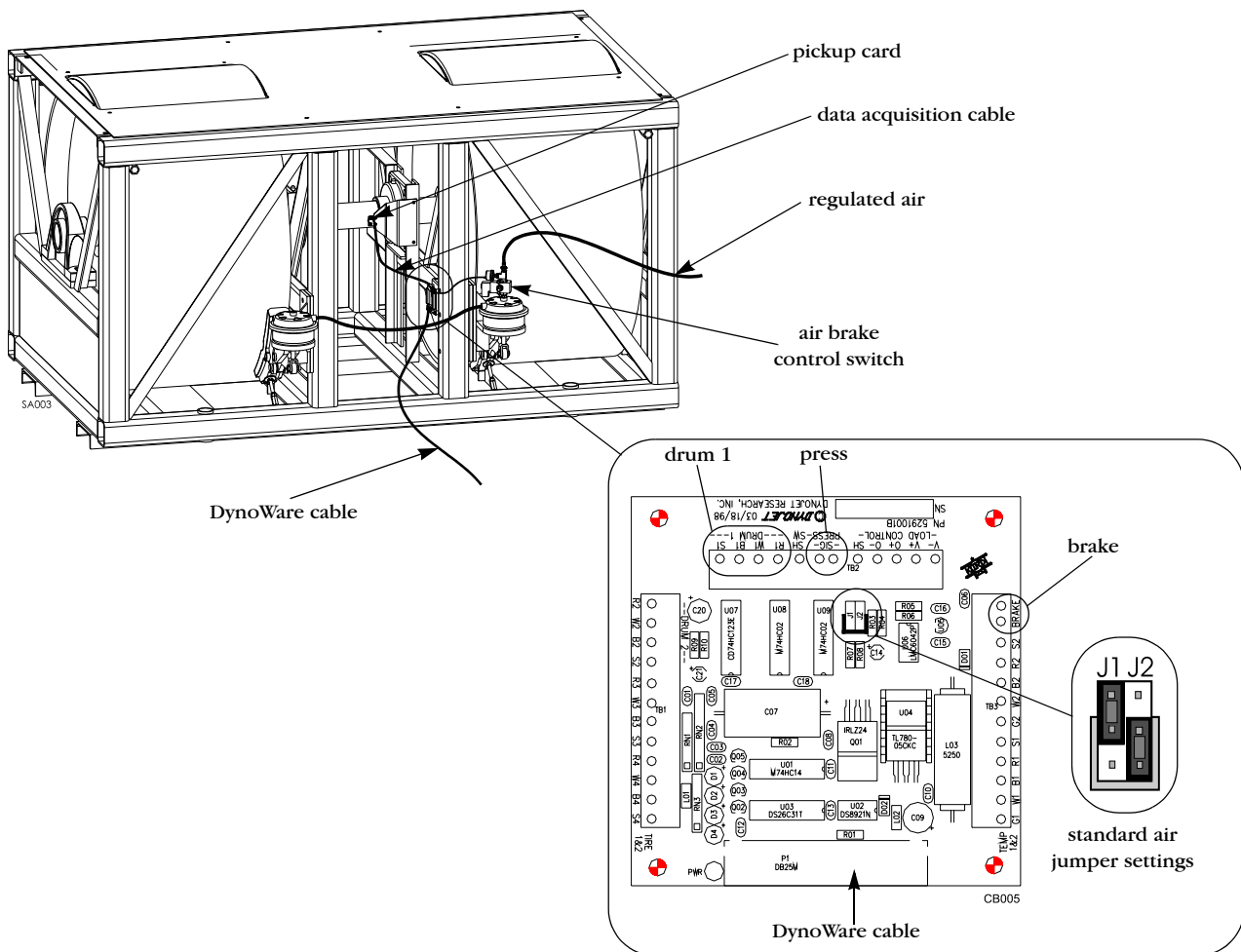


Figure 7: Standard Air—Wiring



CONNECTING YOUR SHOP AIR TO THE DYNO



Dynojet recommends using an air filter/dryer. Failure to use clean, dry air will compromise the integrity and life of the air components.

- 1 Mount the air pressure regulator on the wall in the shop with the bracket provided.
- 2 Connect a supply air hose to the inlet of the regulator from your shop air supply. The regulator should be set to 60 psi.
- 3 Connect the 3/8-inch air hose to the outlet side of the regulator and connect the other end of the air hose to the barbed inlet fitting on the air control switch on top of the right air canister on the dyno. Refer to Figure 7.

Note: Make sure the arrow on the regulator is the same as the direction of the air flow.

WIRING THE DYNOWARE EX+ MODULES

- 1 Place the DynoWare EX+ modules in a safe location in the shop that is close enough to the computer and the dyno for the cables to reach.
- 2 Attach the cables to the DynoWare EX+ modules. Refer to Figure 8 for cable placement.
 - Attach the 9-pin shielded serial cable from the PC to the RS-232 socket on the CPU module. Tighten the screws. A 9-pin to 25-pin adapter may be required.
 - Attach the 25-pin shielded cable from the dynamometer to the Dynamometer Input/Output module. Tighten the screws.
 - Attach the 9-pin connector from the hand-held pendant to the Dynamometer Input/Output module. Tighten the screws.
 - Attach the 3-pin plug from the power supply to the CPU module with the flat side facing down.
- 3 Plug the power supply into an electrical outlet.
- 4 Turn the power switch on at the CPU module and verify operation with WinPEP.



Figure 8: Attach the DynoWare EX+ Cables

PROPORTIONAL AIR BRAKE INSTALLATION

This appendix contains instructions for installing the proportional air (prop air) brake system to the model 248 automotive dynamometer (dyno). To ensure safety and accuracy in the procedures, perform the procedures as they are described.

PARTS LIST

The following table lists all of the parts included in the Proportional Air Brake Installation kit. Check your kit against the parts listed to make sure you have received all of the parts. If any part is missing, contact Dynojet Technical Support.

part number	description	quantity
21619200	Temperature Sensor Bracket	1
31614100	DIN Rail	1
36560834	Screw, 1/4"-20 x 1/2", Button-head	4
44997101	Temperature Sensor	1
64111001	Prop Air Regulator Sub Assembly	1
64111002	Control Valve Sub Assembly (electronic pressure regulator, EPR)	1

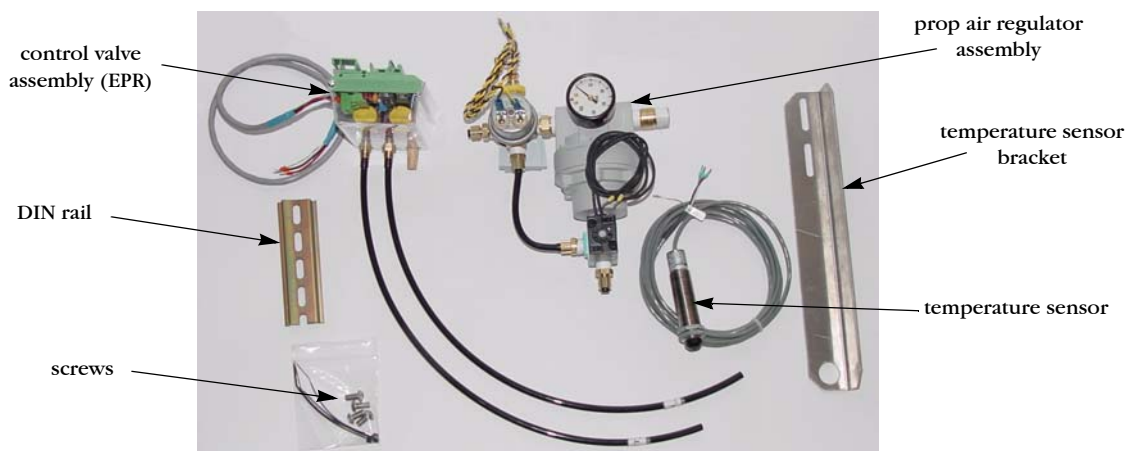


Figure A-1: Proportional Air Brake Components



INSTALLATION

This section describes the procedures to remove the standard air brake system, install the proportional air brake system, and wire the Breakout board.

REMOVING THE STANDARD AIR BRAKE SYSTEM

- 1 Turn off the power on the DynoWare EX+ hardware.
- 2 Shut off and release the air pressure to the air pressure regulator.
- 3 Remove the two black wires from the wiring block labeled BRAKE on the Breakout board.
- 4 Remove the yellow and black wires from the wiring block labeled PRESS on the Breakout board.
- 5 Disconnect the 3/8-inch air hose from the fitting on the air brake control switch. The air brake control switch is located on top of the right side air canister.
Note: Leave the air hose with the dyno as it will be used later.
- 6 Unscrew and remove the air brake control switch.

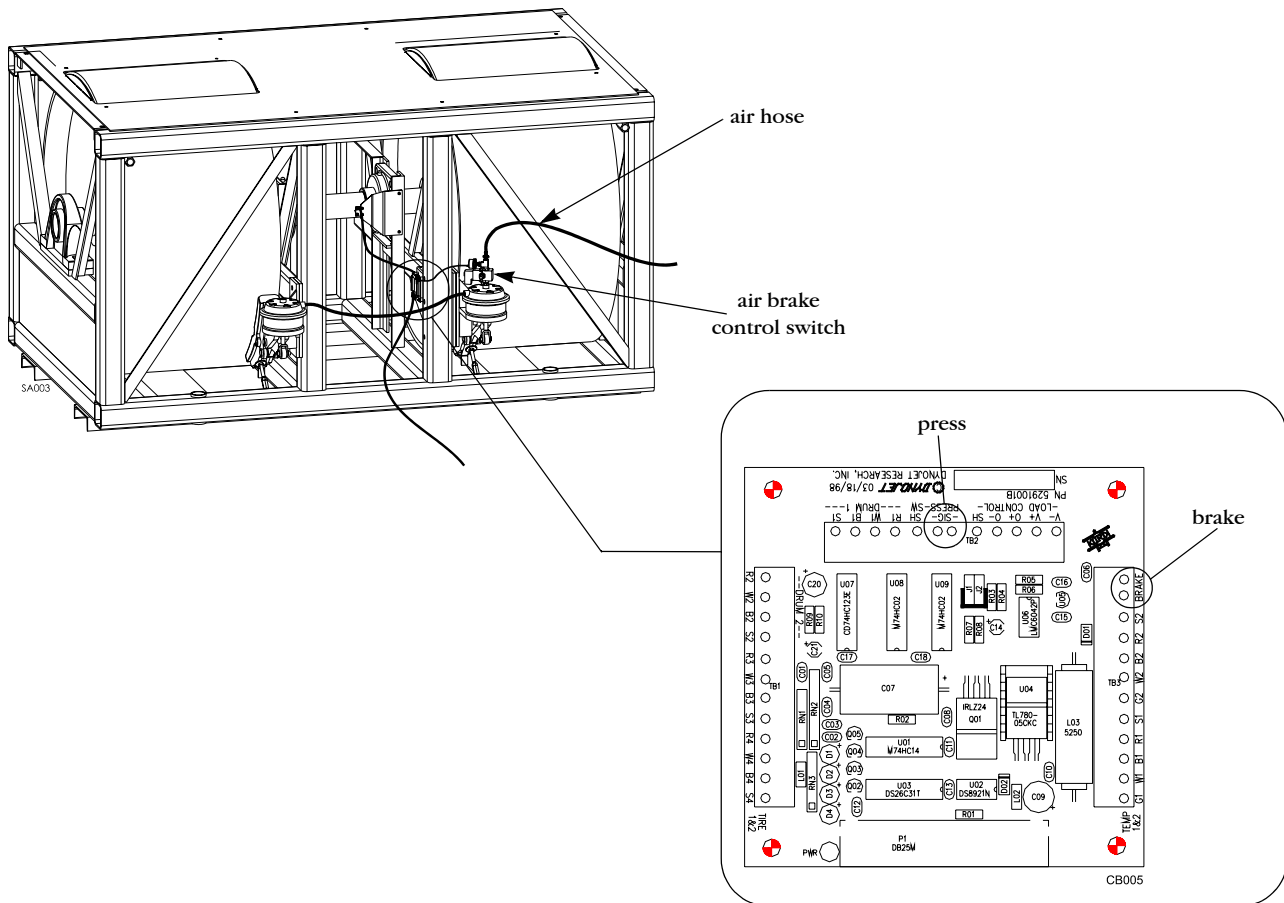


Figure A-2: Remove the Standard Air Brake



INSTALLING THE PROPORTIONAL AIR BRAKE SYSTEM

- 1 Install the DIN rail.
 - 1a Clamp the DIN rail to the right post 14-inches down from the top of the dyno frame.
 - 1b Using a center punch, mark two mounting holes in the middle of the top and bottom slots. Remove the clamp and bracket.
 - 1c Drill and tap the mounting holes for 1/4-inch UNC bolts.
 - 1d Secure the DIN rail to the dyno using two 1/4-inch button head allen bolts.
- 2 Install the control valve assembly (electronic pressure regulator, EPR). The EPR snaps into place.

Hook one side of the EPR on the DIN rail then rotate it toward the DIN rail until it snaps into place.

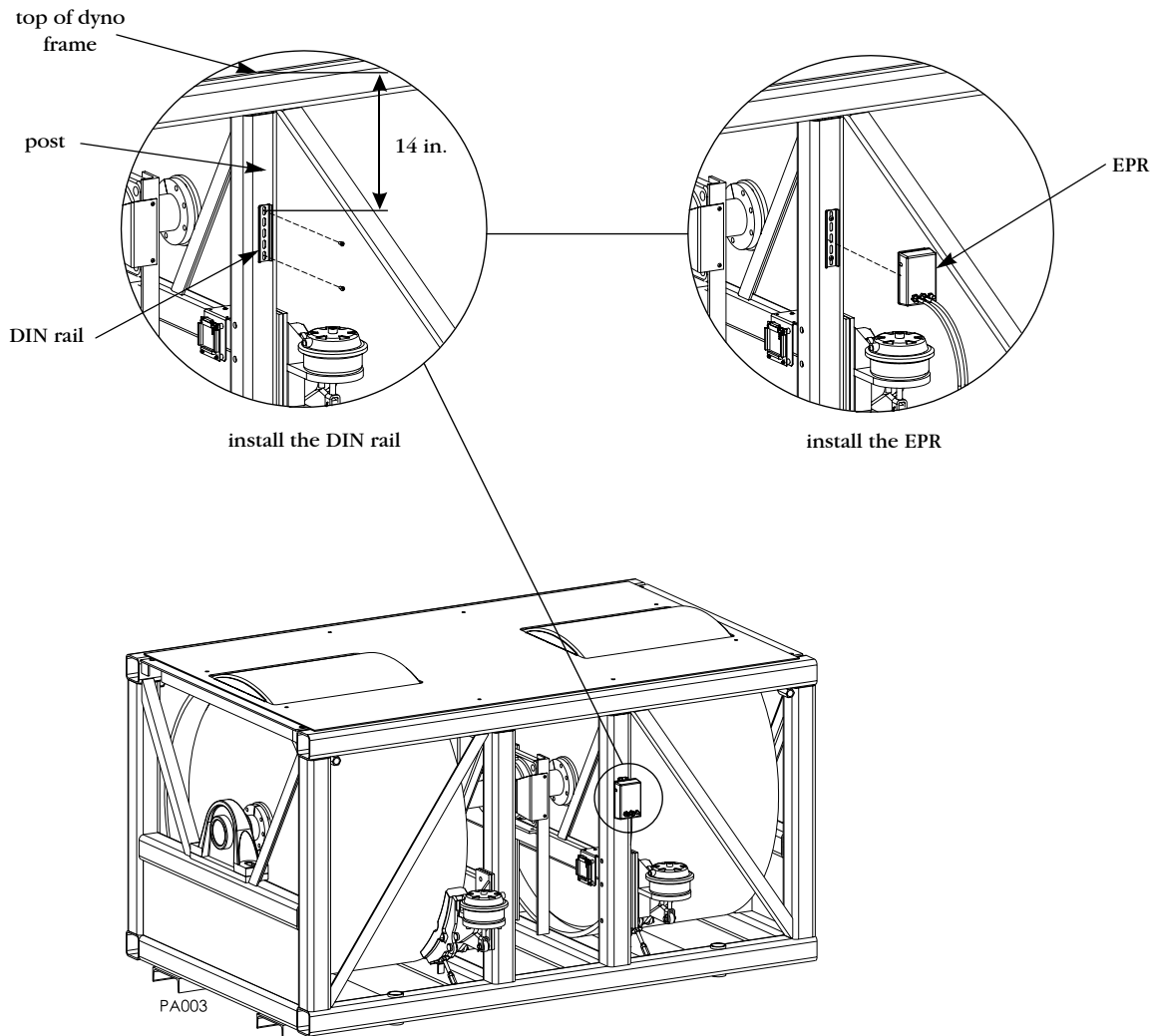


Figure A-3: Install the DIN Rail and EPR



- 3 Install the temperature sensor.
 - 3a Clamp the temperature sensor bracket to the left post 24-inches down from the top of the dyno frame.
 - 3b Using a center punch, mark the bracket mounting holes in the middle of both slots. Remove the clamp and bracket.
 - 3c Drill and tap the mounting holes for 1/4-inch UNC bolts.
 - 3d Loosely attach the bracket to the dyno using two 1/4-inch button head allen bolts. Do not tighten the bolts.
 - 3e Install the temperature sensor so it is approximately three inches from the surface of the drum.
 - 3f Adjust the bracket so the temperature sensor is aimed at the interface of the knurl and brake surface. Tighten the bolts to secure the bracket.
- 4 Screw the prop air regulator assembly into the right side brake canister. Tighten it so the air gauge is facing out

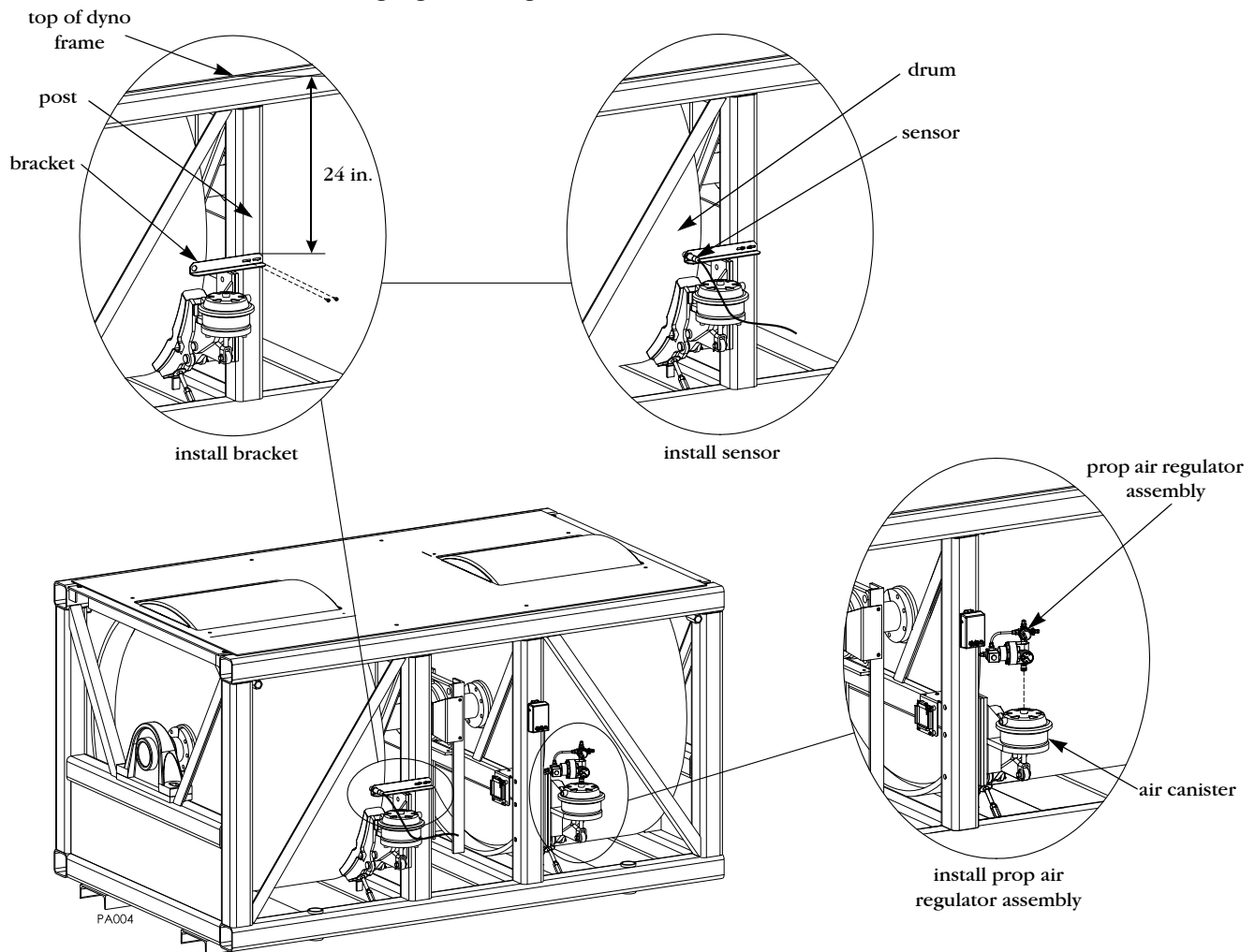


Figure A-4: Install the Temperature Sensor and Prop Air Regulator Assembly



- 5 Attach the air line labeled OUT from the EPR to the three-way valve on the prop air regulator assembly. Push the hose in and hand tighten the fitting.
- 6 Attach the air line labeled IN from the EPR to the brass four-way fitting on the prop air regulator assembly.
Note: Pull on both hoses to ensure they are secure. If there is movement, tighten the fitting.
- 7 Connect your shop air to the dyno.

CAUTION

Dynojet recommends using an air filter/dryer. Failure to use clean, dry air will compromise the integrity and life of the air components.

- 7a Mount the air pressure regulator on the wall in the shop with the bracket provided.
- 7b Connect a supply air hose to the inlet of the regulator from your shop air supply and a 3/8" air hose to the outlet side. The regulator should be set to 60 psi.
- 7c Connect the 3/8" air hose coming from the air pressure regulator to the barbed inlet fitting on the prop air regulator assembly

Note: Make sure the arrow on the regulator is the same as the direction of the air flow.

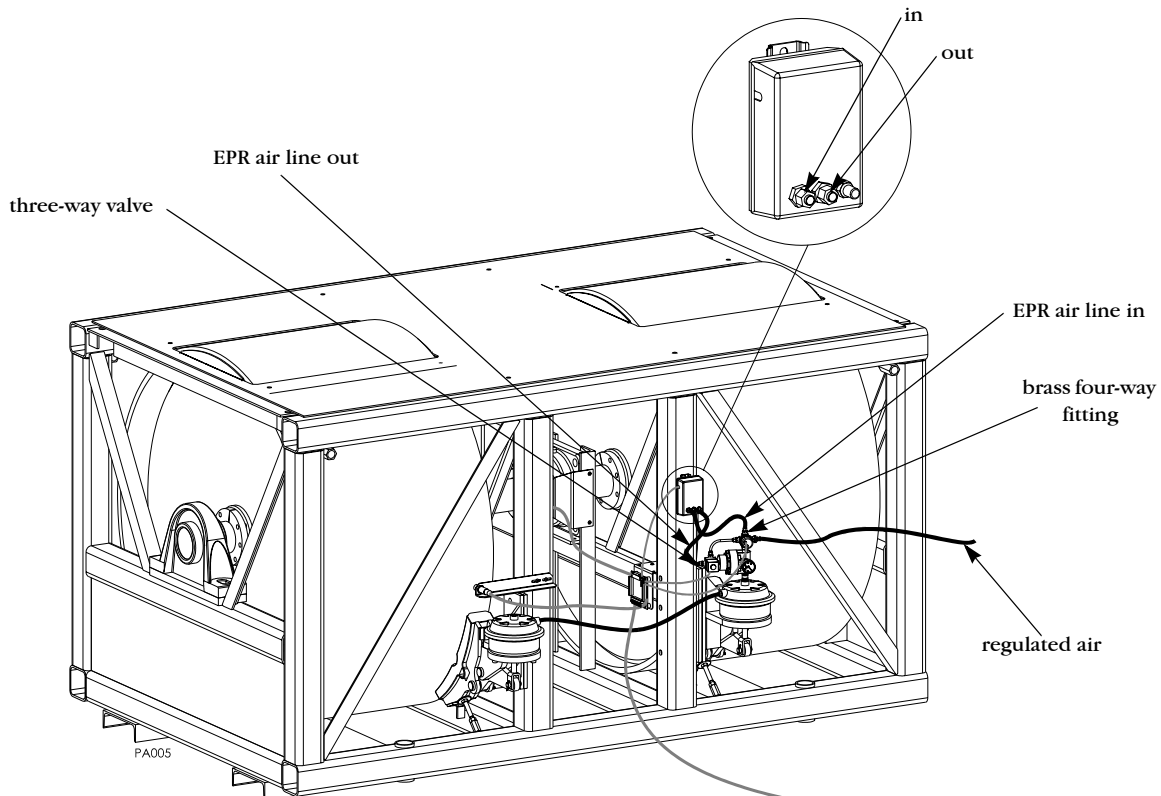


Figure A-5: Routing Cables—Air Lines



WIRING THE BREAKOUT BOARD

When attaching cables, refer to Figure A-6 for cable location and Figure A-7 for Breakout board wiring information.

- 1 Attach the data acquisition cable coming from the optical pickup card on the dyno to the Breakout board. The data acquisition cable has four wires which connect to the wiring block labeled DRUM 1.
 - Red wire connects to R1
 - White wire connects to W1
 - Black wire connects to B1
 - Silver wire connects to S1
- 2 Attach the wires from the air pressure switch, located on the prop air regulator assembly, to the wiring block labeled PRESS on the Breakout board. Each wire may attach in either position.
- 3 Attach the cable coming from the EPR to the Breakout board. The EPR cable has five wires which connect to the wiring block labeled LOAD CONTROL.
 - Black wire connects to V-
 - Red wire connects to V+
 - White wire connects to O+
 - Green wire connects to O-
 - Silver or ground (shield) wire connects to SH
- 4 Attach the brake wires from the brake solenoid, located on the prop air regulator assembly, to the wiring block labeled BRAKE on the Breakout board. Each wire may attach in either position.
- 5 Attach the temperature sensor cable to the Breakout board. The temperature sensor cable has five wires which connect to the wiring block labeled TEMP on the Breakout board.
 - Green wire connects to G1
 - White wire connects to W1
 - Black wire connects to B1
 - Red wire connects to R1
 - Silver or ground (shield) wire connects to S1



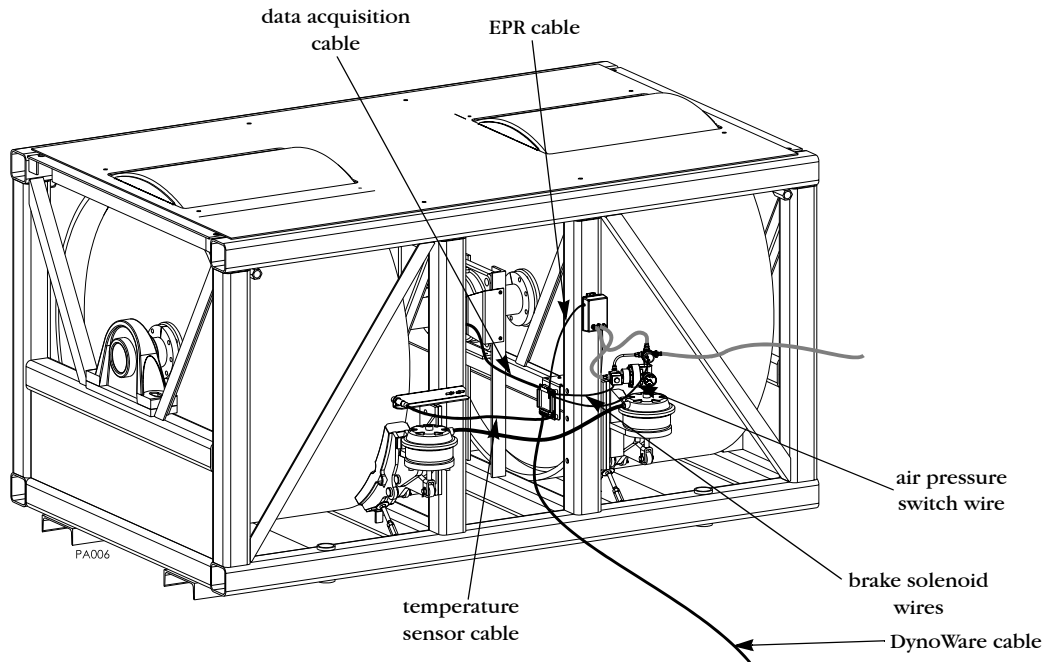


Figure A-6: Routing Cables—Breakout Board

- 6 The Breakout board jumper settings are preset, however, verify jumpers J1 and J2 are set for the proportional air brake as shown in Figure A-7.
- 7 Plug the 25 pin DynoWare cable into the bottom of the Breakout board and tighten the thumb screws.
- 8 Continue with “Wiring the DynoWare EX+ Modules” on page 8.

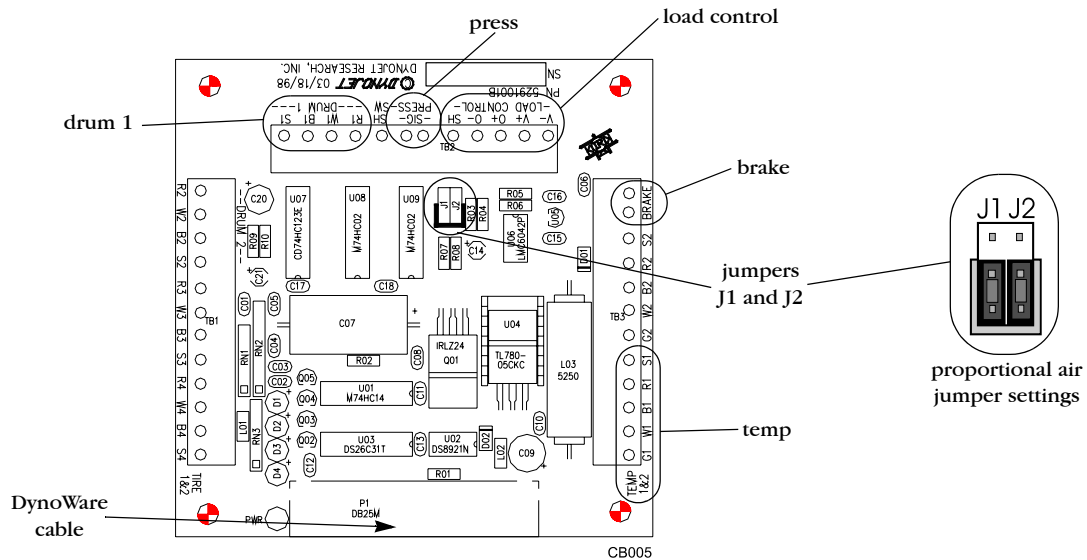


Figure A-7: Prop Air—Wiring